DIN EN 16603-20-40:2024-02 (E)

Space engineering - ASIC, FPGA and IP Core engineering; English version EN 16603-20-40:2023

Table of contents

European Foreword 6

Introduction 7

1 Scope 8

2 Normative references 9

3 Terms, definitions and abbreviated terms 10

3.1 Terms from other standards 10

3.2 Terms specific to the present standard 10

3.3 Abbreviated terms 17

3.4 Conventions 19

3.4.1 Names of DEVICE development phases and reviews 19

3.4.2 Companies involved in the DEVICE development 20

3.4.3 Types of DEVICEs and requirements tailoring tag notation 20

3.5 Nomenclature 21

4 Principles 22

4.1 DEVICE development 22

4.2 Verification methods 22

5 DEVICE engineering 23

5.1 General requirements 23

5.1.1 Overview 23

5.1.2 Tailoring according to DEVICE type and DEVICE criticality 23

5.1.3 DEVICE engineering development flow 23

5.1.4 Phase Reviews 25

5.1.5 DEVICE Verification Control Document 25

5.2 DEVICE Definition Phase 27

5.2.1 Overview 27

5.2.2 DEVICE Requirements Specification 27

5.2.3 DEVICE Development Plan 27

5.2.4 Preliminary Verification and Validation Plans 28

5.2.5 Preliminary DEVICE Support and Maintenance Plan 28

5.2.6 Feasibility and Risk Assessment 28
5.2.7 DEVICE Definition Phase Review 29
5.3 DEVICE Architecture Definition Phase 29
5.3.1 Overview 29
5.3.2 Architecture Definition 29
5.3.3 Updated DEVICE Verification and Validation Plans 30
5.3.4 DEVICE Architecture Definition Phase Review 30
5.4 DEVICE Design and Verification Phase 30
5.4.1 Overview 30
5.4.2 DEVICE Verification Plan 31
5.4.3 DEVICE Design and Verification 31
5.4.4 DEVICE Database 32
5.4.5 Preliminary DEVICE Data Sheet 33
5.4.6 DEVICE Design and Verification Phase Review 33
5.5 DEVICE Detailed Design Phase 34
5.5.1 Overview 34
5.5.2 Netlist Generation 34
5.5.3 Netlist verification 36
5.5.4 DEVICE Data Sheet update 36
5.5.5 DEVICE Database update 36
5.5.6 DEVICE Detailed Design Phase Review 37
5.6 DEVICE Layout Phase 37
5.6.1 Overview 37
5.6.2 Layout generation 37
5.6.3 Layout verification 39
5.6.4 DEVICE Validation Plan 39
5.6.5 DEVICE Database update 39
5.6.6 DEVICE Data Sheet update 39
5.6.7 Preliminary ESCC Detail Specification 39
5.6.8 DEVICE Layout Phase Review 40
5.7 DEVICE Implementation Phase 40
5.7.1 Overview 40
5.7.2 Production and test 41
5.7.3 DEVICE Database update 41
5.7.4 DEVICE Validation Plan completion 42
5.7.5 DEVICE Implementation Phase Review 42
5.8 DEVICE Validation, Qualification and Acceptance Phase 42

5.8.1 Overview 42
5.8.2 DEVICE validation 43
5.8.3 DEVICE Support and Maintenance 43
5.8.4 Experience Summary Report 43
5.8.5 Final versions of application and procurement documents 44
5.8.6 DEVICE Validation, Qualification and Acceptance Phase Review 44

6 Pre-tailoring according to DEVICE criticality and type 46
6.1 DEVICE criticality categories 46
6.2 Pre-tailoring Matrix 49

Annex A (normative) DEVICE Requirements Specification (DRS) - DRD 93

Annex B (normative) DEVICE Development Plan (DDP) - DRD 98

Annex C (normative) DEVICE Verification Plan (DVeP) - DRD 101

Annex D (normative) DEVICE Validation Plan (DVaP) - DRD 106

Annex E (normative) DEVICE Support and Maintenance Plan (DSMP) - DRD 108

Annex F (normative) DEVICE Feasibility and Risk Assessment Report (DFRAR) - DRD 110

Annex G (normative) DEVICE Architecture Definition Report (DADR) - DRD 114

Annex H (normative) DEVICE Data Sheet (DDS) - DRD 117

Annex I (normative) Experience Summary Report - DRD 119

Annex J (informative) Generic Development Flow Variations 120

Annex K (informative) DEVICE Development Expected Outputs 126

Annex L (informative) Equivalence of phase and milestone terminology of ECSS-M-ST-10 and ECSS-E-ST-20-40 134

Bibliography 139

Figures

Figure 5-1: DEVICE development flow (generic case) 26
Figure J-1 : Example of DEVICE development flow with intermediate additional reviews 121
Figure J-2 : Example of DEVICE development flow variation with two DEVICE modules developed and reviewed in parallel 122
Figure J-3 : Example of DEVICE development flow variation where three phases have been merged 124

Figure J-4 : Example of DEVICE development flow where three phases are iterated 125

Tables

Table 6-1: DEVICE criticality categories 47
Table 6-2: Pre-tailoring Matrix 50
Table K-1 : Summary of expected outputs of engineering flow 126
Table K-2 : ECSS-E-ST-20-40 and ECSS-Q-ST-60-03 list of expected document outputs 128
Table L-1 : Equivalence of phase and milestone terminology of ECSS-M-ST-10 and ECSS-E-ST-20-40.....135